

~~Sub A. A Ma
of transmitted sy~~

5 a plurality of data sources relating respectively to state transition
6 probabilities and observed values of received data symbols;
7 means for calculating and storing the likelihood metric and survivor bit for
8 each state of the trellis using values from said data sources;
9 means for determination of the final state on the maximum likelihood path
10 in the trellis; and

1 2. The system of claim 1 further comprising:
2 a method for computing supporting branch metric parameter calculations
3 wherein branch metric parameters are computed recursively for a Gray coded sequence of
4 states, wherein said recursive computation requires only a single addition operation per
5 branch metric parameter per state, thereby substantially reducing the number of
6 computational steps required per branch metric parameter calculation.

1 4. The MLSE of Claim 2 wherein said branch metric parameters are
2 computed in real time as needed for state metric calculations, and wherein the sequencing
3 of the states is according to a Gray code for both branch metric calculations and state
4 metric calculations, thereby achieving a substantial savings in data storage requirement.

34

4 initial state register paired with initial state mask register wherein said pair
5 of registers define a set of valid initial states representing prior knowledge about the
6 transmitted sequence; and

7 means for initialization of trellis state metrics such that the MLSE Viterbi
8 algorithm selection of the maximum likelihood path in the trellis is confined only paths
9 having a valid initial state.

1 6. The MLSE of Claim 1 further including means to utilize prior
2 knowledge about the initial trellis to enhance MLSE estimation performance of said
3 transmitted sequence, said performance enhancing means including:

4 final state register paired with final state mask register wherein said
5 register pair define a set of valid final states representing prior knowledge about the
6 transmitted sequence; and

7 means for selection of the final state of the trellis on the maximum
8 likelihood path such that the MLSE Viterbi algorithm selection of the maximum
9 likelihood path in the trellis is confined only to paths having a valid initial state.

1 7. The MLSE of Claim 2 further including means to provide
2 sufficient data for the class of soft decision generators that are dependent only on partial
3 path metrics.

1 8. A method of computing a maximum likelihood sequence estimate
2 comprising:

3 providing an initial state;

4 providing an initial state mask comprising a plurality of bits having either
5 a first polarity or a second plurality; and

6 determining a plurality of valid initial states by:

7 starting with the initial state; and

8 substituting a don't care for each bit in the initial state which has a
9 corresponding bit having a first polarity in the initial state mask,

10 wherein the valid initial states are defined by either a one or a zero in the
11 bit position having a don't care, and the same bit as the initial state in the other positions.

1 9. The method of claim 8 wherein the initial state mask is determined
2 by a power up characteristic of a transmitter.

1 10. The method of claim 9 wherein the transmitter is compliant with
2 the Global System for Mobile standard.

1 11. A method of computing a maximum likelihood sequence estimate
2 comprising:
3 providing a trellis comprising a plurality of nodes corresponding to a
4 plurality of states at a plurality of stages;
5 providing a present state comprising a series of bits; and
6 incrementing the present state to a next state by changing only one bit.

1 12. The method of claim 11 wherein the incrementing the present state
2 to a next state by changing only one bit is done in a Gray code.

Ab
Cont.

006080" 00092960